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Accessibility in online documentation

Joanna Suau describes how to improve the accessibility of your online output for disabled readers who use assistive tools.

Millions of users go online every day. We are constantly connected to the World Wide Web. We gather information, we shop, we communicate. This is why it's so vital that we, as creators of online content, don't constrain access to an integral section of our everyday audience - people with varying disabilities.

The American Psychological Association describes disability as a "functional limitation that affects an individual's ability to perform certain functions."[1] This includes making use of the online content.

To mitigate the impact of disabilities in accessing information, online documents should be designed with accessibility in mind. The term accessibility used in this context means making information and technology usable for the entire spectrum of audience, not excluding anyone on the basis of their physical or mental capabilities.

José María Fernández Gil, Accessibility Specialist for the Vice Rectorate of Student Body and Employment of the University of Alicante with many years of experience in the design of accessible digital content[2], defines accessibility as a measure to which extent everyone can perceive, understand and browse a digital document regardless of their technical, cognitive or physical capabilities.

Accessibility is a measure by which everyone can perceive, understand and browse a digital document regardless of their technical, cognitive or physical capabilities.

Generating an accessible output requires an awareness of how both the design element and linguistic sides of a document can affect usability and readability.

If you've never considered the notion of accessibility in your content or the layout of your documentation, this article could be a good starting point, as it will attempt to identify the needs of the target audience, explain how they digest online material, and what linguistic and design aspects you, as a communicator, should consider to make your content more accessible.

Who needs accessible documentation?

As stated in the introduction, online documentation needs to be accessible for audiences with disabilities and impairments that arise from physical, cognitive, visual, auditory and neurological challenges. This is why it is important to use suitable language, design functional layout, and generate consumable outputs.

One could dispute that overall structure of the document or a type of output has none to little impact on accessibility. However, if we take into account various tools typically employed by people with disabilities to assist their online experience, it becomes clear that they are in fact imperative. How you write and what font you use is as important as how you tag your headers and images or design your tables.

Technology commonly used to assist online access

Online users with disabilities typically access online material by means of assistive technology. Therefore, accessible documentation should account for these tools to help them do their job in the most optimal way.

Listed below are the most common types of assistive tools you should be aware of when designing accessible documentation. For now, let's just focus on the way these tools digest online output, I will then discuss how to cater for them in your documentation.

Tools typically used by a visually impaired audience

These tools are capable of detecting all kinds of text, including text in dialog boxes, text boxes, lists and tables, icon and image labels, commands on menus, tooltips, etc.

- Screen readers. Convert the text that appears on screen into computer-generated voice output, Braille or audio signals. Screen readers are typically an in-built feature of a computer.
- Content magnifying feature. Magnifies on-screen content. A built-in functionality of any operating system, can usually zoom in up to 1600%.
- Word-processing software. Provides a text-to-speech feature that uses a speech synthesiser to read the selected on-screen content.

Tools typically used by an audience with hearing impairment

These tools are also used to provide translations or a simpler and more concise version of an audio output.

- Closed/open captioning. On-screen text view of any audio output. Open captioning can be switched off, closed is embedded in the audio content.
- Speech processing software. Provides a speech-to-text feature that converts audio into text.

Tools typically used by an audience with motor disabilities

- Chart-retrieval systems. Used to enter a message by selecting words from the choices that are presented in a chart.
- Mouth sticks. Enable users to control computer input. Mouth sticks operate on the principle of a mouse and a pointer.
- Chording keyboards. Advanced devices that allow their users to push multiple keys simultaneously in different patterns to type text or issue a command. A user is able to operate keys like Shift, Control, Command, Alt or Function.

How to make an online document accessible

You'll probably find most of the aspects listed below something you, as a professional communicator, already do when thinking about content. We do it for different reasons. We want to alleviate the stress of searching for information, we want to reach out to a demanding or frustrated audience, or we want to achieve a perfect score for findability and readability.

The aim of the five points in the list below is to assure you that your efforts in making your work clear and understandable through various means of presenting information and grooming your layout are helpful in more than one dimension. Clearly-structured output and well-written content ensures that an audience with disabilities can also benefit from your documentation.

1. Language - make documentation easy to understand

Presenting complex concepts in a clear and easy to understand fashion is already the main rule of technical writing. This becomes especially vital when writing for an audience with cognitive or learning disabilities like dyslexia.

Tense and voice

Wherever it's possible, use present tense and active voice. Keep your sentences concise. This makes it easier for the user to understand and retain the message you are trying to convey.

Never assume that every reader is familiar with slang or jargon expressions.

Jargon, acronyms and abbreviations

You should never assume that every reader is familiar with slang or jargon expressions, so it's best to substitute them with more commonly understood words.

Acronyms are also quite tricky. Not everybody is familiar with every acronym, especially if it has only recently been coined, like FOMO (Fear Of Missing Out) or is highly-specialised, like IoT (Internet of Things). If your audience doesn't know the meaning and is not able to guess it from the context, we are running into danger of losing a portion of our audience that will get discouraged by unfamiliar and confusing content. It's good practice when using acronyms/abbreviations to define their meaning at first use in a document, then use the shortened version thereafter. Or create a glossary.

Additionally, when accounting for assistive technology, some commonly used abbreviations that a typical reader wouldn't have problems with, can prove problematic for a screen reader to interpret. Depending on the localisation configuration, the abbreviation 'Gov.' can be interpreted as two different words, 'government' for British-English or 'Governor' for American-English voice setting.

Punctuation

It goes without saying that you should always use correct grammar, and above all, correct punctuation. Punctuation is especially important for screen readers. Most readers are advanced enough to identify punctuation marks, and adapt their reading flow so that it sounds more human-read than machine-read. Therefore, every comma or full stop should elicit a brief pause, and the pitch of voice should change to indicate a question.

2. Layout - facilitate reading experience

The format and layout of a document is vital for people using screen readers that analyse the structure, and use it to provide additional information, like section title, table header, etc. Similarly, a larger typeface and a wise use of whitespace make your document more accessible for people with visual impairments that don't use assistive tools to access content.

Font

Carefully consider the use of typeface for your document. The two most commonly used font families are sans serif (Arial, Verdana) and serif (`Courier New`, Times New Roman).

In print, serif fonts are easier to read, with sans serif fonts used for headings.

In digital output, sans serif is generally perceived as the most friendly of fonts. However, if your content is mostly aimed at audience with severe visual impairments, consider using a serif typeface that makes it easier to distinguish between certain letters, such as "o" and "a" or "i" and "l".

To comply with most accessibility guidelines, the minimum font size to use is 12 point whereas according to the SWING project the optimal size is 14.[3]

Background

Make sure that the contrast between the background and the font colour is sufficient. For example, avoid light grey text on a white background. High colour contrast makes text and images easier to read and comprehend. Web Content Accessibility Guidelines (WCAG) 2.0[4] published and maintained by The World Wide Web Consortium (W3C) - the main international standards organisation for the World Wide Web - recommends a minimum ratio of 4.5:1 for large text and 7:1 for other text and images.

Document architecture

When designing the layout of your document, make sure you tag each heading, subheading and paragraph, and break your text into short logical chunks separated by noticeable whitespace. Carefully designed layout, divided into meaningfully called and properly tagged sections, is easier to scan, helps screen readers make sense of the content, and simplifies jumping between sections, if using keyboard commands or shortcuts.

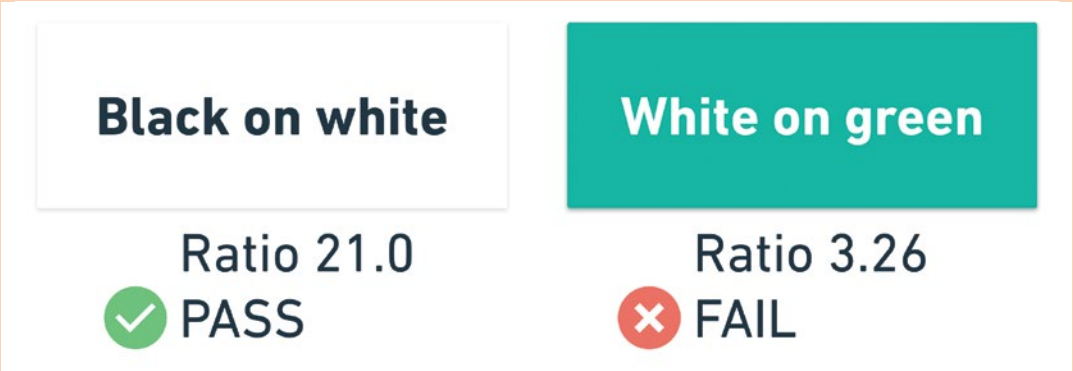

Figure 1. Examples of font colour against background colour and their contrast ratio score

3. Styling and formatting - improve usability

The way you style your content has a tremendous impact on how different assistive tools access and make sense of your documentation. It is always good practice to provide additional text to support formatting, instead of relying heavily on visual output. For example, if you want to flag information as important, in addition to making it visually more prominent, add the word 'important'.

Bullet points

Whenever possible, use bullet points or numbered lists to enumerate ideas in a clear way, making sure each individual point is brief and to the point. That way, you avoid excessively stylised sentences and confusing punctuation. Similarly, to facilitate reading experience, use stylised bullets with care, as they can be confusing to decipher, and also can trigger Unicode mapping errors for screen readers or some browsers.

Hyperlinks

Hyperlinks should all be meaningful and properly flagged, for example, <h ref>, so that a screen reader can recognise them without difficulty. An ideal link text will inform a reader about the topic or the destination of the link, and avoid ambiguous phrases like **click here** or **learn more**. For example, see Figure 2.

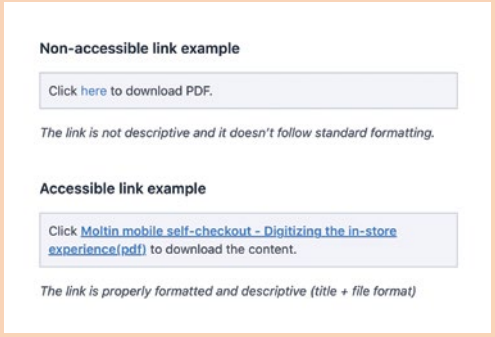

Figure 2. Example of badly-formatted and well-formatted hyperlinks

Tables

Screen readers can recognise properly tagged tables, so don't hesitate to use them. However, make sure that your tables are not overly complicated. Nested rows or columns are laborious to tag for the author but also easy

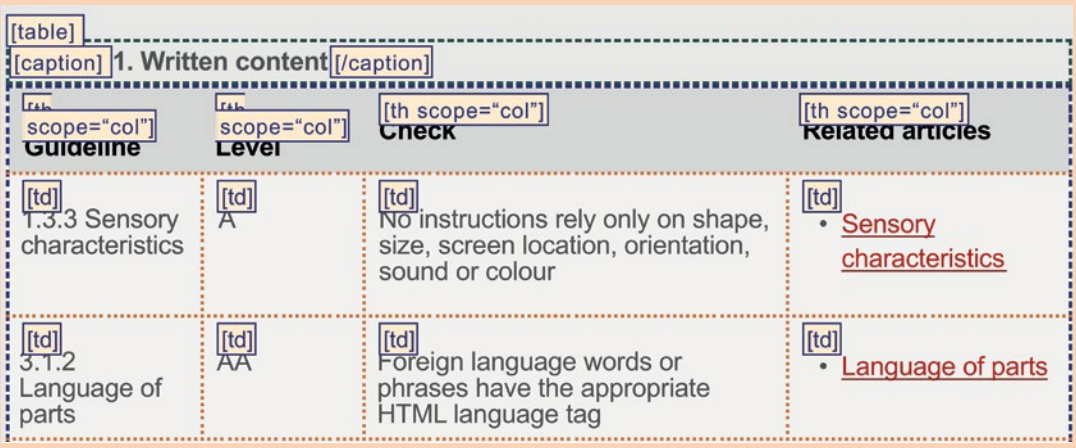

Figure 3. Table tags displayed by the Web Accessibility Toolbar - software developed to aid manual examination of web pages

for a reader to get lost in, especially one with a visual impairment who has them read by a screen reader row by row. For example, see Figure 3[5].

Images and icons

Without visual representation an audience can run into danger of losing the context. Images are especially helpful to people with a learning or cognitive disability in aiding them to follow what's happening in the text. However, images should not be the only method of communication, because they may not load or may not be seen.

Images should complement the text and vice versa. Image placement should therefore be carefully considered. Images placed randomly in the content disrupt the flow of the text, and make it confusing rather than helpful. It is always better to place an image at the end of a paragraph, allowing for considerable whitespace between the text and the image.

Additionally when tagging an image (for example, <img>), you should always provide a fall back text (<alt>) for the screen reader to use, as well as a label explaining the meaning of the image. As for the image format, use flattened files to handle layered graphics or background shading. Otherwise, the image tagging could break the image itself by displaying the layers in wrong order.

Images should complement the text. Placement should be carefully considered.

Avoid using colour alone to express meaning. A colour-blind audience will need additional indicators. The Google Style Guide for accessibility[6], provides a very good example of how to provide a visual and textual representation of a message you wish to convey.

4. Videos and audio output - provide multidimensional access

Accessible video and audio content[7] is beneficial to the wide range of intended audiences, not only people with various hearing impairments, but also those with cognitive disorders and visual disabilities. An accessible video should be delivered by an accessible media player, and shouldn't have an auto-play function switched off.

Open and closed captions

For audio and video elements, provide text transcripts and captions, making your content available in other formats. Some platforms, like YouTube provide an automatic captioning feature when a video is uploaded. It can be a good starting point for correct time stamping, which can be quite a laborious process.

Well-written captions omit unnecessary information to ensure they provide only the gist of the content. It is always a good idea to edit and trim your captions, so that they appear on screen long enough to be read and understood properly.

Audio description

Audio description is a separate narrative audio track that describes important visual content. The aim of the description is to provide a narrative of what's happening in the video, especially if the video includes only visual content (on-screen text, key actions that are not obvious from the audio, etc.).

Video content

Make sure that your video doesn't include flashing images. Content that flashes more than 3 times in a one-second frame can induce seizures in users with photosensitive disorders.

Keyboard navigation

Provide the users that rely on keyboard navigation the means to access and exit your video without having to close their browser and start again.

5. User Interface - create a friendly platform

Web accessibility is a set of website creation practices and rules that are designed to allow assistive technology to interpret web pages. The Web Accessibility Initiative — Accessible Rich Internet Application (WAI-ARIA)[8] document provides a collection of accessibility states and properties which are used to support platform accessibility APIs on various operating system platforms.

```
<img src="newsletter.gif" alt="Free newsletter. Get recipes, news, and more." />
```

Figure 4. Example of image tagging

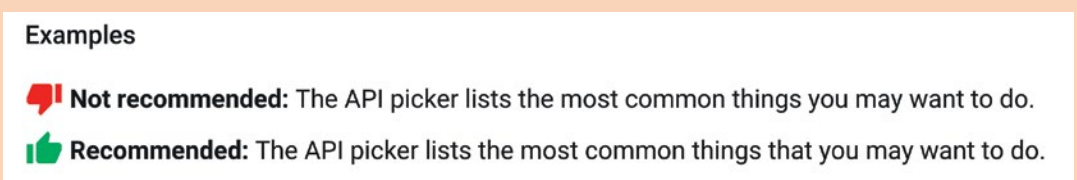

Figure 5. Google style guide example of a well-formatted note that uses both visual (colour and icon) and textual (Recommended/Not recommended) prompts

Tagging content

Semantic HTML is the foundation of accessibility in a web application. Using the various HTML elements we can reinforce the meaning of information in our online documentation and enhance the browsing experience for those who use assistive tools to access online content.

Write your HTML in a meaningful sequence that can be read and understood without any CSS. Your HTML layout should reflect the way the page is intended to be read. Be mindful of the fact that each label in your markup is exposed to and used by screen readers.

Headers should be nested in order. Never skip a header level for styling reasons. <h1> should always be used as the title of a page a user is on, and should be followed by <h2> and <h3>…, etc. To avoid confusion, avoid excessive nesting.

Keyboard/mouse navigation

Make sure that your content is fully operable with one device, keyboard or mouse. Never use the onclick event (mouse) only. Use it always with the onkeyup event (keyboard). In both HTML and SVG, the tag <tabindex> is an important way browsers support keyboard focus navigation for implementations of WAIARIA.

Setting certain landmark elements in your HTML code such as <title>, <main> or <aside> to identify page regions allows users with assistive technology to quickly navigate to these sections. Properly documenting the <title> tag will ensure that the user will be set in the proper context of the document from the very beginning of the reading experience.

Summary

The topic of accessibility is broad, and the audience in need of accessible documentation is highly diversified. It is hard to cater for every disability. José María Fernández Gil who has worked on accessibility for more than a decade admits that it is hard to design a perfectly accessible digital output, but if a web/content creator develops awareness and empathy for the problem, it's the first important step towards opening online environments so they will be accessible by everybody without restrictions.

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```
<header>
    <title>Title displayed on the browser's tab</title>
    <h1>Site Title</h1>
    <nav><!-- Link --></nav>
</header>
<main>
    <h1>Page Title</h1>
    <section>
        <h2>Section Title</h2>
        <p>Lorem ipsum dolor sit amet, <strong>consectetur</strong> adipiscing elit.</p>
            <h3>Subsection Title</h3>
            <p>Nam tempus tellus odio, et handrerit mauris ultricies eu.</p>
            <ol>
                <li>pik pok,</li>
                <li>bichito.</li>
            </ol>
    </section>
</main>
<footer>
    <!-- Site credit -->
</footer>
```

Figure 6. Sample HTML page structure

References

[1] Ability Magazine, 'Guidelines to Terminology' (online) available at https://abilitymagazine.com/terminology3 (accessed September 2018)

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[3] José María Fernández & Carolina Madeleine, 'SWING Project, Training Course on Accessible Documents' (online) available at www.josemariafernandez.es/archivos/swing-accessible-documents (accessed October 2018)

[4] W3C, 11 December 2008; 'Web Content Accessibility Guidelines (WCAG) 2.0' (online) available at www.w3.org/TR/WCAG20/#visual-audio-contrast (accessed September 2018)

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[6] Google Developer Documentation Style Guide, October 26 2017; 'Accessible content' (online) available at https://developers.google.com/style/accessibility (accessed September 2018)

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[8] W3C Web Accessibility Initiative (WAI), 'WAI-ARIA Overview' (online) available at www.w3.org/WAI/standards-guidelines/aria (accessed October 2018)

Further reading

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Accessibility:

Collins A (2018) 'Broaden your audience with accessibility' *Communicator*, Autumn 2018: 12-13

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Watson L (2013) 'Digital accessibility' *Communicator*, Winter 2013: 22-24

Williams M (2011) 'Blinded by colour' *Communicator*, Autumn 2011: 20-21